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Table of Contents

Page

Introduction.....	4
BODY.....	4
Key Research Accomplishments.....	5
Conclusion.....	5
References.....	6
Appendices.....	7

Annual Report

10/15/11

RE: Research project. Optimizing Screening and Risk Assessment for Suicide Risk in the US Military.
(Recruiters)

Introduction:

Suicide rates have been increasing in military personnel in the last several years (Lorge, 2008), and it is a vital goal that suicide screening and risk assessment techniques for members of the military be improved. The proposed project is an effort to accomplish this goal, by using a parsimonious yet fruitful research design to compare several highly promising risk assessment approaches to one another in the prediction of future suicide-related outcomes. The design is being implemented in a large military sample that has been documented to be at high risk for suicidal behavior, namely, army recruiters. Full access to the sample has been granted. This project will deliver more efficient, economical, and effective suicide screening measures and risk assessment procedures that can be adapted to any area of the military.

Body:

Army IRB review has been completed. The study is now up and running. Day 1 of data collection was on 10/4/11. The results of the first day are pasted below.

1st day was an overall success. PAX were presented with the study (ARC (71 PAX) and CC (10 PAX)).

The results for those surveyed on 04OCT2011 are as follows:

Total Count of Those Given the Option to Participate in the Study:

190

Total Completed Stress and Mental Strain Survey (SAMSS):

130

Total Completed Alternate Survey (AS):

24

Total Who have opted to Not Participate (NP):

36

In addition, we will be providing the survey to 15 people on 10/24/11 at 13:30
and 75 individuals on 10/25/11 at 1330.

Thus, overall it was a good start with over half of the individuals in the trial run(s) participating in the research. There were no major glitches, everything went relatively smoothly, and the internet sites worked well also. The ARC (71 PAX) was presented the study at 12:50 and was completed at appx. 13:22 (32 minutes), prior to our 13:30 deadline (the next class). The CC (10 PAX) was presented the study at 1500 and completed at appx. 15:21 (21 minutes).

Data collection is continuing to run in full swing and will continue until data collection is complete.

Informed consent: Tricare is being used to review all Medicare records. In order to avoid participant anxiety when their records are being accessed, Dr. Archuleta is handling access of records instead of command. The purpose of using Tricare is to see what kind of care Participants are receiving, specifically mental healthcare.

Participant Consent. Consent is being obtained in a group format. A script will be read when the class comes in, which will explain the study. They will then receive a hand out consent form. A question and answer forum will take place at this point. A psychologist will be the presenter for this process.

SIR database Data will be transferred from USAREC to FSU in an encrypted format. It will be un-encrypted once it has reached FSU.

How are people being presented with the assessments? Assessments are being presented in group format. Individuals sit in front of computers at individual workstations. All assessments are being obtained by computer. The assessments happen on the 2nd day of school. Participants will have a 1.5 hr time frame for both assessments.

All work will follow the following timeline:

Statement of Work

Task 1. Begin and complete baseline data collection; start longitudinal tracking (timeframe, months 1-12):

- 1a. Begin baseline data collection (timeframe, 1 month).
- 1b. Continue and complete baseline data collection (timeframe, months 1-12).
- 1c. Begin longitudinal tracking (timeframe, months 1-12).

Task 2. Continue and complete longitudinal tracking (timeframe, months 12-30).

- 2a. Continue longitudinal tracking (timeframe, months 12-30).
- 2b. Complete longitudinal tracking (timeframe, month 30).

Task 3. Data analysis; manuscript and report writing (timeframe, months 31-36).

- 3a. Complete data analysis (timeframe, months 31-34).
- 3b. Manuscript and report writing (timeframe, months 33-36).

Key Research Accomplishments:

Our group has recently published an article in Clinical Psychology Review.

Selby, E.A., Anestis, M.D., Bender, T.W., Ribeiro, J.D., Nock, M.K., Rudd, D.M., Bryan, C.J., Lim, I.C., Baker, M.T., Gutierrez, P.M., & Joiner, T.E. (2010). Overcoming the fear of lethal injury: Evaluating suicidal behavior in the military through the lens of the Interpersonal-Psychological Theory of Suicide. *Clinical Psychology Review*. 30, 298-307.

Please see abstract below.

Abstract:

Suicide rates have been increasing in military personnel since the start of Operation Enduring Freedom and Operation Iraqi Freedom, and it is vital that efforts be made to advance suicide risk assessment techniques and treatment for members of military who may be experiencing suicidal symptoms. One potential way to advance the understanding of suicide in the military is through the use of the Interpersonal-Psychological Theory of Suicide. This theory proposes that three necessary factors are needed to complete suicide: feelings that one does not belong with other people, feelings that one is a burden on others or society, and an acquired capability to overcome the fear and pain associated with suicide. This review analyzes the various ways that military service may influence suicidal behavior and integrates these findings into an overall framework with relevant practical implications. Findings suggest that although there are many important factors in military suicide, the acquired capability may be the most impacted by military experience because combat exposure and training may cause habituation to fear of painful experiences, including suicide. Future research directions, ways to enhance risk assessment, and treatment implications are also discussed.

Conclusion:

Dr. Lim is up and running at Ft. Jackson. All work will follow the above referenced statement of work timeline.

References

- Lorge, E. (2008). Army responds to rising suicide rates Retrieved September 17, 2008, from <http://www.behavioralhealth.army.mil/news/20080131armyrespondtosuicide.html>.
- Selby, E.A., Anestis, M.D., Bender, T.W., Ribeiro, J.D., Nock, M.K., Rudd, D.M., Bryan, C.J., Lim, I.C., Baker, M.T., Gutierrez, P.M., & Joiner, T.E. (2010). Overcoming the fear of lethal injury: Evaluating suicidal behavior in the military through the lens of the Interpersonal-Psychological Theory of Suicide. *Clinical Psychology Review*. 30, 298-307.

Appendices

Clinical Psychology Review 30 (2010) 298–307



Contents lists available at [ScienceDirect](#)

Clinical Psychology Review



Overcoming the fear of lethal injury: Evaluating suicidal behavior in the military through the lens of the Interpersonal–Psychological Theory of Suicide

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abstract

Suicide rates have been increasing in military personnel since the start of Operation Enduring Freedom and Operation Iraqi Freedom, and it is vital that efforts be made to advance suicide risk assessment techniques and treatment for members of the military who may be experiencing suicidal symptoms. One potential way to advance the understanding of suicide in the military is through the use of the Interpersonal–Psychological Theory of Suicide. This theory proposes that three necessary factors are needed to complete suicide: feelings that one does not belong with other people, feelings that one is a burden on others or society, and an acquired capability to overcome the fear and pain associated with suicide. This review analyzes the various ways that military service may influence suicidal behavior and integrates these findings into an overall framework with relevant practical implications. Findings suggest that although there are many important factors in military suicide, the acquired capability may be the most impacted by military experience because combat exposure and training may cause habituation to fear of painful experiences, including suicide. Future research directions, ways to enhance risk assessment, and treatment implications are also discussed.

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Contents

1. Military service and death by suicide	299
2. The Interpersonal–Psychological Theory of Suicide	299
2.1. The desire for death	299
2.2. Acquired capability.	300
2.3. The combined desire for death and acquired capability	300
3. Military service and mental health.	300
3.1. Negative psychological effects of combat exposure and training.	300
3.2. Risk factors for problematic outcomes following combat exposure	300
3.3. Military service and psychopathology	301
4. Evaluating the link between military service and suicide with the IPTS	301
4.1. Combat experience and acquired capability	301
4.2. Combat training and acquired capability.	302
4.3. Military service and thwarted belongingness	302
4.4. Military service and perceived burdensomeness	303
4.5. Overall IPTS framework and summary.	304
5. Discussion	304

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E.A. Selby et al. / *Clinical Psychology Review* 30 (2010) 298–307

299

5.1. Future research directions	304
5.2. Improving suicide screening and risk assessment	304
5.3. Improving treatment for suicidality in the military	305
6. Conclusion.	305
Acknowledgments	305
References	306

1. Military service and death by suicide

Suicide is a significant cause of death in the general population, with approximately one million deaths by suicide each year world-wide ([National Institute of Mental Health, 2008](#)). In the United States, the suicide rate is approximately 11 deaths by suicide for every 100,000 people ([Benda, 2005](#)). Thus, suicide is a major public health concern in the general community. Suicide is also the second most common cause of death in the United States Armed Forces, with rates of between 9 and 15 deaths by suicide per 100,000 people ([Ritchie, Keppler, & Rothberg, 2003](#); [U.S. Department of Defense, 2007](#)). Although this is a similar rate of death by suicide as in the civilian population, the military suicide rate during times of peace is generally lower than the civilian rate ([Kang & Bullman, 2008](#)). Furthermore, previous studies have indicated that military service may be a risk factor for suicidal behavior ([Kaplan, Huguet, McFarland & Newsom, 2007](#)), and that the most common type of traumatic death suffered during armed forces training was suicide ([Scoville, Gardner, & Potter, 2004](#)).

In recent years the suicide rate of military personnel and veterans appears to be rising ([Kang & Bullman, 2008](#); [Lorge, 2008](#)), which has sparked a pressing interest in better ways to identify suicidal ideation and treat those military personnel who are affected. Since the start of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF), the suicide rate for military personnel who have seen combat has increased to that of the general population ([Kang & Bullman, 2008](#)), and perhaps beyond. This alarming increase suggests that exposure to combat may be an important factor that may cause or at least contribute to later death by suicide. At the same time, military service appears to have some qualities that lower suicide risk in times of peace, with deaths by suicide during basic training being as low as 5 deaths for every 100,000 military recruits ([Scoville et al., 2004](#)). Thus, the

relationship between military service and suicidal behavior appears to be quite complex, serving as a risk factor for some and a protective factor for others.

Unfortunately, research on the mechanisms through which military service influences suicide risk one way or the other is sparse. Employing new theoretical approaches to suicide may shed light on the recent alarming elevation in suicide rate, and aid military health professionals in providing efficient, economical, and effective assessments and treatment for suicidality. The purpose of this review is to integrate current research on the psychological effects of military service and training, and evaluate how those effects may influence suicidal behavior through the framework of the Interpersonal– Psychological Theory of Suicide (IPTS; [Joiner, 2005](#)). Using this theoretical framework the many influences of military service on suicidal behavior may be illuminated, which may, in turn, suggest important assessment strategies and treatment implications.

2. The Interpersonal–Psychological Theory of Suicide

In his Interpersonal–Psychological Theory of Suicide, [Joiner \(2005\)](#) delineates a theory of suicidal behavior that focuses on three necessary, jointly sufficient variables that must be present for an individual to make a lethal suicide attempt: thwarted belongingness, perceived burdensomeness, and the acquired capability to enact lethal

self-injury. These three domains can be used to determine not only who desires to die by suicide, but also who is most capable of engaging in lethal suicidal behavior. This determination is important because there is evidence that although approximately 15% of the U.S. population seriously considers suicide at some point in the course of their life (Nock, Borges, Bromet, Alonso et al., 2008), only 1.4% of the population actually dies by suicide (Nock, Borges, Bromet, Cha et al., 2008). Importantly, the suicide attempt to completion ratio is estimated to be 25 to 1, further indicating that a substantial number of people try to die by suicide, but only a few do, many of whom do so only after multiple previous attempts (McIntosh, 2009). Thus, there appears to be something preventing many suicidal people from dying by suicide, despite their desire. IPTS suggests that all three aforementioned domains must be present for extreme suicidal behavior, and that the low base rate of individuals exhibiting sufficiently high levels of all three factors is what accounts for the low suicide death rate. In order to better understand suicide in the military, we will describe the IPTS in more detail. As will be discussed later on, there may be many important aspects of military service that may influence these variables, some for the better, others for the worse.

2.1. The desire for death

Perceptions of burdensomeness and thwarted belongingness constitute what the IPTS refers to as a “desire for death.” Essentially, it is through the combination of these two constructs that IPTS attempts to answer why someone would want to die by suicide. The more intense the combination of these factors, the more intense one's suicidal ideation is likely to be.

Thwarted belongingness, as conceptualized in the IPTS, is defined as an unmet need to belong that involves a lack of frequent, positive social interactions, and feelings of not being cared about by others (Baumeister & Leary, 1995). The “thwarted” aspect of belongingness indicates that, although some individuals may attempt to meet desires to belong, there may be barriers that are preventing them from successfully doing so. Thwarted belongingness is applicable to individuals who genuinely lack social support networks, as well as individuals who have contact with family and friends but feel that they are not genuinely connected to those individuals. Studies have found the construct of thwarted belongingness to be highly related to suicidal ideation (Van Orden, Witte, Gordon, Bender, & Joiner, 2008), suicide attempts (Conner, Britton, Sworts, & Joiner, 2007; Witte, Duberstein, Conwell, Beckman, & Joiner, in preparation), and completed suicide (Joiner, Hollar, & Van Orden, 2006). Instances of increased connection to others, on the other hand, have been linked to decreases in death by suicide (Joiner et al., 2006).

The second component of a desire for death is perceived burdensomeness. This domain of the IPTS involves a sense on the part of the individual that he or she is a burden to others around him/her, not only failing to make meaningful contributions to society, but also serving as a liability to others. Because of these feelings, the individual assumes that his or her death is worth more to others than his or her life. It is important to note the “perceived” component, as those who believe they are a burden may feel this way despite evidence to the contrary. Perceived burdensomeness has been linked to suicidal ideation (Van Orden et al., 2008), attempted suicide (Joiner et al., 2009, 2002; Van

Orden et al., 2008), and death by suicide (Joiner et al., 2002; Pettit et al., 2002).

There is also evidence indicating that there is an interaction between perceived burdensomeness and thwarted belongingness which predicts increased suicidal ideation and more previous suicide attempts (Joiner et al., 2009). Although military service may influence both of these factors in different ways, these factors may not be where military service most directly influences suicide risk. The primary influence of military experience on suicidal behavior, as we hope to demonstrate through this review, may lie with the final domain of the IPTS, acquired capability.

2.2. Acquired capability

Although perceived burdensomeness and thwarted belongingness explain why someone might desire death, the acquired capability for lethal self-injury (hereafter referred to simply as acquired capability) postulates who is capable of death by suicide. Acquired capability involves the degree to which an individual is able to withstand the fear of death, an outcome that is psychologically frightening and likely to be physically painful. Joiner (2005) posited that, because a lethal or near-lethal suicide attempt is extremely fear-inducing and often involves intense physical pain, experience with and habituation to the fear and pain involved is a prerequisite for a serious suicide attempt. It is this variable that separates individuals who desire to die by suicide but do not attempt or do so using a very low lethality method, from those who actually make a nearly lethal attempt or die by suicide.

The IPTS suggests that acquired capability is developed over time through repeated exposure to painful and provocative events. Through the experience of painful and provocative events, pain and fear become less aversive and easier to tolerate. Joiner (2005) argues that this process mirrors the manner in which jumping out of a plane for skydiving, or parachute training in the case of the military, results in terror the first time one does it, but results in significantly less terror with each subsequent jump. A similar process may exist with suicidal behavior. Consistent with this possibility, Van Orden et al. (2008) found that individuals with previous suicide attempts and greater exposure to painful and provocative events (a composite variable of non-suicidal self-injury, exposure to violence, aggression, etc.) may be more capable of self-injurious behaviors than those who have not experienced those events. Acquired capability and experience with painful and provocative experiences have been linked to number of previous suicide attempts (Joiner et al., 2005, 2007, 2009; Van Orden et al., 2008) and death by suicide (Brown, Beck, Steer, & Grisham, 2000; Holm-Denoma et al., 2008).

2.3. The combined desire for death and acquired capability

Although the purpose of this review is not to extensively present evidence supporting the IPTS in general, it is important to point out two recent studies testing this theory in order to illustrate the empirical foundation upon which it is built. The first study, conducted by Van Orden et al. (2008), found an interaction between perceived burdensomeness and thwarted belongingness significantly predicted suicidal ideation and that individuals with more previous suicide attempts exhibited higher scores on a measure of acquired capability. They also found an interaction between acquired capability and perceived burdensomeness predicted clinician-rated suicide risk. The second study, conducted by Joiner et al. (2009), found an interaction between low family social support and feelings that one does not matter (perceived burdensomeness) that predicted suicidal ideation beyond measures of depression. This second study also found that the three-way interaction between measures of thwarted belongingness and perceived burdensomeness, and previous number of suicide attempts (as a proxy for acquired capability), predicted current suicide attempt status, again beyond indices of depression and other

covariates. Thus, although IPTS is a relatively new theory, there appears to be accumulating evidence supporting its ability to predict suicidal ideation and behavior.

3. Military service and mental health

Before discussing IPTS factors in relation to military service, it is important to understand the influences of military service on mental health. The psychological effects of military service in general, and combat exposure in particular, go beyond suicidal behavior and can involve problems with depression, anxiety, and substance use, among others.

3.1. Negative psychological effects of combat exposure and training

Former President Dwight Eisenhower once said of combat: "I hate war as only a soldier who has lived it can, only as one who has seen its brutality, its futility, its stupidity." This quote appropriately summarizes the experience of combat, an experience that, for most, is difficult; for many incomparably so. It is also an experience that can be difficult to comprehend if one has never seen it. In this review we define combat as the *in vivo* experience of wartime conflict including actual engagement in conflict with armed, hostile forces, as well as witnessing such conflict. Although this is a rather broad definition, the theaters of war vary tremendously, as do the opposing forces. Furthermore, civilians can also experience combat, even if they are not actively engaged in the conflict. Thus, this definition is inclusive of conflict, or witnessing thereof, with legitimate armed forces, guerrilla forces, or terrorist organizations.

There is no doubt that engaging in combat is a terrifying experience for most who experience it, although with enough experience that fear, like any other, may decrease through habituation. Yet, despite the difficulties and potentially horrifying experiences, the majority of those who enter theaters of war remain relatively unaffected (Hotopf et al., 2006). This can be seen in previous studies in which approximately 30% of military personnel developed psychological symptoms as a result of combat experience (Schlenger et al., 1992). Although many who see combat may have some problematic reactions, for many those problems may not be to the point of causing clinical impairment. It is also possible that many problems go unreported. Despite the finding that most seem to be unaffected, there remains a large minority of individuals who experience combat who do develop clinically significant symptoms. For example, there is evidence that veterans of OIF are experiencing higher rates of mental health problems, with approximately 20% of active duty and 42% of reserve personnel reporting problems severe enough to require mental health treatment (Milliken, Auchterlone, & Hoge, 2007). Furthermore, there appears to be a strong dose–response relationship between amount of combat exposure and severity of mental health problems (Dohrenwend et al., 2006). Thus, increased frequency and intensity of combat exposure may be better predictors of negative psychological outcomes than predisposing factors or brief combat exposure (Hoge et al., 2004; Hoge & Castro, 2006).

3.2. Risk factors for problematic outcomes following combat exposure

Some of the most important predictors for development of problems and psychopathology following combat exposure include previous trauma history (accidents, assaults, and natural disasters) and younger age (King, King, Foy, & Gudanowski, 1996), pre-combat history of psychiatric illness (Brewin, Andrews, & Valentine, 2000), problematic family relationships prior to combat (Iverson et al., 2007), and lower intellectual ability (Gale et al., 2008). Other risk factors include exposure to prior trauma and sexual abuse (Clancy et al., 2006; Cabrera, Hoge, Bliese, Castro, & Messer, 2007), exposure to a mentally

ill person in the home, exposure to alcoholism in the home, psychological abuse, and violence directed against one's mother ([Cabrera et al., 2007](#)).

3.3. Military service and psychopathology

Exposure to combat zones has been shown to increase rates of somatic symptoms, psychological distress, impaired health status, and greater health-related physical and social impairment in functioning ([The Iowa Persian Gulf Study Group, 1997](#)). Various studies have shown that exposure to combat is a risk factor for elevated symptoms of depression ([Lapierre, Schwegler, & LaBauve, 2007](#)), posttraumatic stress disorder (PTSD; [Bullman & Kang, 1994](#); [Clancy et al., 2006](#); [Elbogen, Beckham, Butterfield, Swartz, & Swanson, 2008](#); [Hoge et al., 2004](#); [Hoge, Terhakopian, Castro, Messer, & Engel, 2007](#); [Koenen, Stellman, Stellman, & Sommer, 2003](#)), and abuse of alcohol and other substances ([Hooper et al., 2008](#); [Jacobson et al., 2008](#); [Prigerson, Maciejewski, & Rosenheck, 2002](#)). Many of these psychological symptoms have been found to last throughout the lifetime of the individual ([Ikin et al., 2007](#)).

Psychopathology may influence suicidal behavior in combat veterans due to increased problems with families, difficulties at work, and by increasing acquired capability. For example, depression can cause difficulty with loneliness and lack of connection, feelings of worthlessness, and difficulty maintaining energy to keep up with an occupation or with family. Those who experience injuries during combat also endorse more depressive and suicidal symptoms ([Koren, Norman, Cohen, Berman, & Klein, 2005](#); [Pitman, Altman, & Macklin, 1989](#)). PTSD is strongly linked to suicidal behavior ([Kessler, 2000](#)), and it is a major predictor of who transitions from suicidal ideation to attempting suicide ([Nock et al., 2009](#)). It is also important to note that there are clinical features commonly experienced by those with PTSD, including, agitation, insomnia, and nightmares; these same clinical features have also been identified as risk factors for suicidal behavior ([Bernert et al., 2005](#); [Fawcett et al., 1990](#)). Substance abuse problems can influence the domains of IPTS in many ways. For example, illicit substances may provide additional methods for death by suicide (e.g., intentional overdose). They may lower the suicidal ideation threshold needed for the individual to attempt suicide (e.g., drugs may facilitate a suicide attempt). Those abusing substances may also drive away those close to them through drug seeking and reckless behavior. Finally, substance use may also increase acquired capability as it may lead the individual to engage in more provocative behaviors (e.g., fighting, criminal activities, and reckless injuries), and some may require self-inflicted pain (e.g., intravenous drug administration).

4. Evaluating the link between military service and suicide with the IPTS

There are many ways in which military service may influence suicidal behavior. Some aspects may increase risk for suicidal behavior, while other aspects of the military may protect against it. We will now detail and discuss the negative influences of military service on each of the three domains of the IPTS. Furthermore, in our discussion of perceived burdensomeness and thwarted belongingness, we will discuss the positive influences of military service, as it is likely that there are many aspects of military service that facilitate increased feelings of belonging and attenuate perceived burdensomeness.

Of the three components of the IPTS, we believe that acquired capability is the most important factor in understanding suicide in the military. This is because unlike thwarted belongingness and perceived burdensomeness — which may be mitigated by military service for some — acquired capability is likely to be universally increased by military service through combat exposure and training. If one has been trained to kill enemies, and trained to overcome significant reservations in doing so, as well as to withstand other hardships, the

same habituation process may generalize to include facing death by suicide, if suicidal ideation is present.

4.1. Combat experience and acquired capability

We begin with the role of combat exposure in acquired capability, as this is the aspect of suicide risk we believe is most profoundly impacted by military service. IPTS posits that acquired capability is developed in response to repeated exposure to painful and fear-inducing situations. Combat exposure is, without a doubt, a source of exposure to pain, fear, and death. Witnessing fellow soldiers severely injured and killed, and killing enemy combatants, are likely to be distressing experiences for most, yet that distress may be attenuated with repetition.

In general, increased suicidal ideation is associated with greater exposure to war zone violence and atrocities ([Yehuda, Southwick, & Giller, 1992](#); [Beckham, Feldman, & Kirby, 1998](#)), and witnessing war time atrocities (e.g., mutilated bodies or mass killings; [Sareen et al., 2007](#)). Findings on actual death by suicide more directly highlight the link between combat exposure and acquired capability. For example, recent evidence suggests that exposure to combat may be increasing the suicide rate of soldiers from OIF and OEF ([Kang & Bullman, 2008](#)). Length of tour of duty has also been associated with death by suicide in Vietnam veterans ([Adams, Barton, Mitchell, Moore, & Einagel, 1998](#)), a finding that may also be relevant to OIF and OEF, as tours of duty for these theaters are longer than previous wars, and multiple tours of duty are common ([Tanielian & Jaycox, 2008](#)). In fact, an Institute of Medicine committee reviewed numerous studies of Vietnam veterans and concluded that there is significant evidence supporting a relationship between deployment to a war zone and suicide in the years after deployment ([Institute of Medicine, 2007](#)).

The evidence presented thus far does not directly support the role of combat exposure increasing acquired capability, and thus suicide potential, *per se*. Direct evidence is less available, as IPTS is a relatively new theory and has not yet been tested extensively in military populations. One study that specifically explored variables from the IPTS in a military sample found that U.S. Air Force personnel who died by suicide were rated as having higher scores on a scale of acquired capability than a comparison sample of active duty air force personnel ([Nademin et al., 2008](#)). It was unclear in this study, however, if there were differences between the two groups in amount of combat exposure, and the group differences in acquired capability may have been present prior to military service. In another study using a military sample, [Bryan, Morrow, Anestis, and Joiner \(2010\)](#) found that active duty members of the United States Air Force exhibited higher levels of acquired capability than did a non-military clinical sample. Active duty soldiers did not differ from the non-military sample on measures of perceived burdensomeness or thwarted belongingness; however, the authors found that an interaction between acquired capability and perceived burdensomeness which predicted suicidal symptoms such that higher levels of both corresponded with highly elevated suicidality.

Although actual acquired capability has not received much attention in explaining military suicide rates, there are other findings that are consistent with the IPTS view that combat exposure is likely to increase acquired capability. For example, one study found that, in comparison to the general population, Vietnam veterans who had been hospitalized for combat wounds were at higher risk for suicide ([Bullman & Kang, 1996](#)). Furthermore, this study also found that those wounded more than once and those with more severe injuries had the highest risk of suicide. Along these lines, elevated suicide rates have also been documented in combat veterans who experienced amputation of a limb ([Bakalim, 1969](#)), as well as those who experienced spinal cord injuries ([Nyquist & Borg, 1967](#)). Different branches of the military may also experience more injuries, which may increase suicide risk. For example, one study of Vietnam veterans found that

individuals in the Army were seven times more likely to die by suicide than were veterans in the other military branches (Adams et al., 1998).

Posttraumatic stress symptoms may also contribute to increased acquired capability through mental habituation to pain and death. In a sample of Vietnam War veterans, Bell and Nye (2007) found that re-experiencing symptoms of PTSD are more highly predictive of suicidal ideation than are other symptoms of the disorder. In turn, re-experiencing symptoms of PTSD have been shown to be associated with the degree to which individuals have been exposed to war atrocities and heavy violence, with greater exposure resulting in more severe symptoms (Hendin & Haas, 1991; Hartl, Rosen, Drescher, Lee, & Gusman, 2005). Nightmares, which have been linked to suicidal behavior (Bernert et al., 2005) and are a common symptom of PTSD, may be an additional form of re-experiencing painful and provocative events.

There may also be indirect routes to developing acquired capability that are a result of combat exposure. There is evidence that many who experience combat may develop a sense of “invincibility,” which may lead them to engage in more risky and dangerous behaviors. For example, more exposure to violent combat, killing another person, and more contact with human trauma were all associated with more risk-related behaviors including substance abuse and physical aggression (Killgore et al., 2008). Another study found that depressed and substance-abusing military personnel who have seen combat are almost as likely to die from reckless accidental death as they are to die by suicide (Thoresen & Mehlum, 2004). These findings indicate that some soldiers who experience combat may develop a fearlessness that leads them to engage in more reckless behaviors such as thrill seeking and substance abuse, a consequence of which may be the experience of pain and provocation. Thus, the same invincibility or fearlessness that develops from combat exposure for some may also have the potential to be used in violence against oneself.

Overall, combat exposure appears to have many negative influences on suicidal behavior. There are numerous ways through which combat exposure may contribute to suicidal behavior in military personnel: witnessing violence against others and against one's fellow service members, enacting violence against others, and experiencing multiple and/or severe injuries in combat are all likely to increase acquired capability. The constant threat of loss of life and severe injury may also cause habituation to fear of death and pain.

4.2. Combat training and acquired capability

Training for combat situations may also contribute to the acquired capability for suicide for all who serve in the military, as intense combat training is required of all who serve. Military training often necessarily involves exposure to the use of violent weapons, simulated combat activities, and other intense situations. The more thoroughly an individual is trained to carry out these activities, the less difficult it may be to engage in real combat situations. Such training may also facilitate imperviousness to fears of death and injury. Although not an extensively studied topic, there does appear to be some evidence that those in the military have a decreased fear of death. Male veterans, in general, appear more likely to utilize firearms in death by suicide (Kaplan et al., 2007), despite many of them not having seen combat. Another study found that both military officers and their wives had decreased fear of death compared to non-military groups (Koob & Davis, 1977). This may be a result of habituation to the threat of death that is often a part of military life, and may be evidence for increased acquired capability. There is also evidence that members of high death-risk occupations, including those in military service, may attempt to deny, suppress, or control anxiety about death (Lewis, Espe-Pfeifer, & Blair, 2000).

One potential area for combat training to increase acquired capability is through severe and/or repeated injuries, as injuries are

common in intensive military training (Munnich & Bridger, 2007). The Army reports that over the last two decades number of recruits injured during basic training ranged from 15% to 35% for men and from 40% to 60% for women (Jones, 1983; Cowan et al., 1988; Knapik et al., 1998). There is also evidence that male Army personnel may obtain injuries due to physical fights when off-duty (Tiesman, Peek-Asa, Zwerling, Sprince, & Amoroso, 2007).

Branch of military training may also influence acquired capability. Suicide rates during basic training were found to be higher in the Army and Marines than in the Air Force and Navy (Scoville et al., 2004); this may be because Army and Marines may have more provocative combat training than the latter two. That is, the latter two may focus more on operational training for ships and aircraft, rather than for direct combat. It is important to note, however, that self-selection may lead individuals with higher levels of acquired capability to enlist in these two branches. Self-selection would not necessarily negate the hypothesis that greater training results in greater increases in acquired capability, but it would obscure inter-pretations of simple group differences.

The specific training that individuals in the military receive may result in more habituation for different forms of provocation. If one is trained to use guns in combat, the use of a gun in suicide may not invoke as much fear as other potential methods. As an illustration, Scoville et al. (2004) listed a number of cases of soldiers who died by suicide. From the cases listed, those who jumped tended to be in the Air Force (decreased fear of heights), those who hung themselves tended to be in the Navy (extensive experience with rope and knots), and those who shot themselves tended to be in the Army or Marines (extensive training with guns). Thus, training with exposure to activities that could be used for suicide may increase habituation to that activity, making its use for suicide less fear provoking.

Despite the constant supervision of soldiers during training and the potential bonds that are formed with fellow recruits, some individuals die by suicide during basic training. In the aforementioned study by Scoville et al. (2004), one of the most common suicide methods during training was self-inflicted gunshot wounds incurred at marksmanship training. This is a surprising finding, given that the soldiers would do this while surrounded by other soldiers, rather than when they were alone. The finding that suicide method may be influenced by occupational access to lethal weapons is further exemplified by the findings of a case-control study in which soldiers who died by suicide tended to do so while on duty, using weapons they acquired as a part of their shift (Mahon, Tobin, Cusack, Kelleher, & Malone, 2005). Interestingly, most of these deaths by suicide occurred during the morning shift, shortly after coming on duty. Thus, understanding the manner in which combat training influences the acquired capability for suicidal behavior may aid in suicide risk assessment.

4.3. Military service and thwarted belongingness

Particular aspects of military service may influence thwarted belongingness in various ways, particularly in veterans who have seen combat and, as a result, have difficulty relating to their family and friends who may have trouble understanding such experiences, or newer personnel who fail to make connections with fellow recruits. But first, it is important to begin with a brief discussion of the positive influence that military service can have on feelings of belonging. Those in the military may form strong bonds and camaraderie with those with whom they serve or train. For example, military personnel may find ways of increasing group coherence through various activities (e.g., acquiring identical tattoos; Coe et al., 1993). This behavior may seem trivial in some ways, but a tattoo may be a strong reminder of a connection with others. Combat experience may also foster the connections that soldiers have with each other, perhaps creating a “brothers-in-arms” bond. For example, the rate of suicide during military basic training is lower than the age-equivalent suicide

rate for the general population (Scoville, Gubata, Potter, White, & Pearse, 2007). Military training may also instill improved ways of handling interpersonal conflict for some, which may benefit non-military relationships. For example, divorce rates of US Air Force Academy graduates are lower than the divorce rate in the general population (McCone & O'Donnell, 2006). Thus, military training may facilitate one's ability to establish and maintain healthy relationships, both in and outside of the military.

Combat experience may be a factor that increases thwarted belongingness for some individuals, however. For example, when veterans return home they may find it hard to express the difficulties of their experiences to their friends and family, or they may feel out of place in civilian life. Similarly, if they fought in an unpopular war, many veterans may feel like they are viewed negatively by their community (Koenen et al., 2003). Taking the life of another may also be a factor that instills thwarted belongingness. For example, guilt about actions during combat has been linked to more severe PTSD symptoms (Henning & Frueh, 1997). These same feelings of guilt may also contribute to feelings of isolation and lack of belonging, perhaps due to thoughts such as "I'm unlovable because of what I've done..." Importantly, this study also found that guilt was particularly associated with the re-experiencing symptoms of PTSD, which we suggested earlier may also increase acquired capability.

Combat deployment causes a great deal of stress on the families of those deployed, and this stress likely contributes to family problems that arise during and after deployment. Parental deployment has been linked to behavioral and academic problems in children (Caselli & Motta, 1995; Levai, Kaplan, Ackerman, & Hammock, 1995; Hiew, 1992). Combat deployment has also been linked to later domestic violence and child maltreatment (Gibbs, Martin, Kupper, & Johnson, 2007), and increased intimate partner violence (Marshall, Panuzio, & Taft, 2005). More combat exposure is a negative indicator of family adjustment after return from a warzone for both men and women (Taft, Schumm, Panuzio, & Proctor, 2008), and combat exposure has also been linked to divorce (Prigerson, Maciejewski, & Rosenheck, 2002).

What is it about combat experience that results in negative interpersonal outcomes? One potential mechanism may be the mistrust that can result from combat. Hypervigilance and paranoid ideation have been found to be significantly correlated with combat exposure (Orsillo, Roemer, Litz, Ehlich, & Friedman, 1998), and these states of mind may be beneficial to the soldier in the combat zone because they may aid survival. But when integrating back into civilian life these experiences may cause difficulties with their families because of constantly being "on-guard." Another potential mechanism may be "emotional numbing," often a symptom of PTSD, that may arise from combat exposure. One study found that Vietnam veterans who experienced emotional numbing reported more interpersonal difficulties and lower overall quality of relationships with their children (Ruscio, Weathers, King, & King, 2002).

As has already been mentioned, military training may facilitate feelings of belonging to a group in some individuals, but for those soldiers who have difficulty connecting with others prior to military training, military experience may actually serve to further aggravate a sense of thwarted belongingness. If they are unable to form these bonds with their military peers, they may experience even stronger feelings of not belonging to the group or being the "odd man out." Non-military relationships may also be implicated. Two important risk factors for suicide in military personnel are living alone and breaking-up with a romantic partner (Farberow, Kang, & Bullman, 1990; Thoresen & Mehlum, 2006; Wong et al., 2001). Another study using psychological autopsy of soldiers found that being unmarried, divorced, or separated was a particularly potent risk factor for death by suicide (Thoresen, Mehlum, Roysamb, & Tonnessen, 2006). So, a global sense of belonging and connection to both military and non-military peers may provide the most protection against suicide.

4.4. Military service and perceived burdensomeness

Feelings of perceived burdensomeness may be a major influence on suicidal ideation for some military personnel. This may be particularly so for those wounded or disabled in combat. We will discuss evidence for perceived burdensomeness in the military shortly, but first there are many ways in which serving in the military may contribute to positive feelings of making a meaningful contribution, thus protecting against perceptions of burdensomeness.

Military service is likely to be a positive occupational experience for most individuals, instilling feelings of honor, accomplishment, contributing to society, and having a sense of mission. Many military personnel may feel like they are part of a greater cause for their country and that they are helping to protect their family. In fact, feelings of pride about serving in the military have been found to exhibit significant negative correlations with a variety of negative outcomes (e.g., depression) in individuals involved in peacekeeping missions (Orsillo et al., 1998). Veterans of World War II and the Korean War reported that combat experience taught them how to cope with adversity and be self-disciplined, and it also instilled feelings of greater independence and broader perspectives on life (Elder & Clipp, 1989).

One review found that most veterans of war and peacekeeping reported more positive than negative effects of theater experience, and that those who viewed the combat as having an overall positive meaning (i.e., a good cause) also reported better psychological adjustment (Schok, Kleber, Elands, & Weerts, 2008). There is also evidence that many Vietnam veterans reported high levels of life satisfaction and attainment (Vogt, King, King, Savarese, & Suvak, 2004), including occupational attainment. Yet, this same study also found that these positive effects of military service were attenuated by exposure to combat, wartime atrocities, perceived threats, and malevolent environments.

For many individuals who experience feelings of positive contribution while serving in the military, a return from combat or discharge from the military may result in experiencing feelings of loss of purpose or perceived burdensomeness. While on the front lines or in the military, the individual may have felt a greater purpose; but, once discharged, the individual may feel like he or she has nothing more to contribute, or that he or she is a drain on society because of disabling injuries or other adjustment difficulties (Brenner et al., 2008). One study found that excessive motivation to excel in the Army was an important risk factor for completed suicide among soldiers who experienced combat (Bodner, Ben-Artzi, & Kaplan, 2006), suggesting that perhaps these same individuals were experiencing greater feelings of failure or perceived burdensomeness at the time of their deaths.

Perceptions of burdensomeness may be particularly increased if one abandons or is expelled from the military. One study of veteran Finnish peacekeepers found that those who did not complete their service commitment due to premature repatriation had increased suicide risk relative to those who completed their service (Ponteva et al., 2000). In another study, a psychological autopsy of soldiers who died by suicide found that involuntary repatriation was a significant risk factor for completed suicide (Thoresen et al., 2006). In a related note, military personnel who develop mental disorders have significantly higher than average rates of attrition from the military (Hoge et al., 2002). There is also some evidence that legal problems, misconduct, unauthorized absences, and substance use problems may mediate the relationship between psychological illness and early attrition from the military (Hoge et al., 2005). Thus, occupational difficulties and repatriation may lead to perceptions of being a burden on the military, and these perceptions may be aggravated by feelings that they are not just failing their duties, but that they are personally failing and hurting their fellow soldiers and their country as well.

Another potential contributor to perceptions of burdensomeness may be survival guilt, an experience for some veterans who feel like they did not deserve to live through combat or that they should have died alongside their friends. These feelings of guilt may particularly contribute to perceived burdensomeness if the individual's action, or inaction, resulted in the death of a friend, perhaps causing feelings of responsibility or failure. These thoughts may then generalize to other aspects of life, through thoughts like, "I'm just making things worse for everyone, just like during the war..." Importantly, survival guilt has been linked to death by suicide in Vietnam veterans (Hyer, McCranie, Woods, & Boudewyns, 1990).

There are several other ways that the negative psychological effects of combat exposure may increase perceptions of burdensomeness. Military personnel who are discharged or complete their service may face a difficult transition from serving their country to reengaging in a different component of society (e.g., previous occupations and returning to school). Those who remain in the military may also have trouble completing their duties due to mental health symptoms. One study found that military personnel are more likely to report "attitudinal barriers," such as concerns about being seen as weak or that unit leadership would treat them differently, to seeking out mental health services, rather than "structural barriers," such as the cost of health care (Hoge et al., 2004). Military personnel experiencing symptoms of PTSD may also experience increased feelings of being a burden on the military. One study of OIF veterans found that those with PTSD (approximately 16% of the sample) reported more sick call visits, more missed workdays, and more problems with physical health (Hoge et al., 2007). Furthermore, approximately one third of the homeless population consists of military veterans (Gamache, Rosenheck, & Tessler, 2003), a situation that may further increase perceived burdensomeness on family and/or society.

There are also scenarios where some soldiers may still be on active duty and experience feelings of burdensomeness. For example, if as a means of punishment or for safety precautions a soldier has his or her service weapon taken away, failing at a task assigned during duty which may result in feelings of failure and perceived humiliation, and/or stern reprimands and/or harangues from superiors could contribute to feelings of burdensomeness. Thus, attempts at "toughening" soldiers up may, for some, result in feelings of failure or being a burden.

4.5. Overall IPTS framework and summary

Overall, military experience is a positive experience for most who serve. Time spent in the military allows many individuals to develop deep bonds with others who serve beside them, fosters feelings of pride and fulfillment in serving one's country, and it may also provide a broader perspective on life. If an individual reports strong relationships with peers and family, and feels that he or she is making an active contribution to his or her country and community, he or she may be buffered from the negative influences of combat exposure and thus at less risk of suicide. Understanding the positive ways in which military experience has influenced the life of an individual may be beneficial for both suicide assessment and treatment.

Importantly, however, there appears to be a dose–response relationship of combat exposure and suicide risk, one that is strong enough that even these protective buffers may erode for some with multiple combat deployments. Most of the negative factors involved in the relationship between military service and suicidal behavior, and their relationships to the three domains of the IPTS, are displayed in Fig. 1. In this framework, pre-service risk factors (although not a comprehensive list) are displayed as feeding into psychopathology. One pre-service factor, experience with trauma, is also displayed with an arrow to acquired capability, as previous traumas may also contribute to acquired capability. These pre-service factors may then serve to influence the development of psychological disorders

such as depression, PTSD, and substance use following combat exposure. Combat exposure may then contribute, through psychopathology in particular, to the three domains of the IPTS because of the interpersonal problems, functional and occupational difficulties, and through symptoms such as the re-experiencing symptoms of PTSD or the physical injuries that arise from substance use. Combat exposure may also have influences on suicidal behavior independent of psychological disorders, such as through directly increasing acquired capability. Thwarted belongingness, perceived burdensomeness, and acquired capability may be further developed through the mechanisms listed beneath each domain of the IPTS. Risk for a lethal suicide attempt would increase, then, as more of these factors are endorsed by an individual. In this model we have also provided a larger and darker arrow for acquired capability for contributing to suicide risk because the evidence suggests that combat exposure and training may be the most profound and widespread negative impact of military service on suicide. Importantly, low endorsement of any of the IPTS domains may indicate less suicide risk.

5. Discussion

5.1. Future research directions

Little research has been conducted exploring the IPTS in military suicide; additional research on the IPTS domains in the military may be beneficial for helping U.S. military personnel. Future studies should explore perceptions of burdensomeness, thwarted belongingness, and levels of acquired capability in military samples, and then compare levels of these variables to community and clinical samples. Future studies should also assess whether initial levels of these variables change following basic training. Change in these variables should also be measured following deployment to war zones and direct combat exposure. Importantly, these variables should also be measured in relation to suicidal ideation and behavior in the military. Finally, evaluating use of IPTS domains in treating and assessing suicidal behavior in the military may also be a promising avenue of research.

5.2. Improving suicide screening and risk assessment

Regular screening of military personnel for suicidal symptoms may be an important way to prevent suicide in active duty personnel. One study of soldiers who died by suicide found that although many of these soldiers effectively maintained their military duties and expectations right up until death by suicide, they also demonstrated signs of emotional deterioration during the last days of their lives (Orbach et al., 2007). Thus, although a member of the military may appear to be functioning adequately, he or she may be masking suicidal ideation and preparation.

The domains of the IPTS may serve as important indicators of suicide risk assessment in clinical settings. Although research directly measuring these variables in the military are few, especially for acquired capability, several studies have reported findings that are consistent with these constructs (e.g., Anestis, Bryan, Cornette, & Joiner, 2009; Brenner et al., 2008; Kaplan et al., 2007). In clinical practice, actual measures of perceived burdensomeness, thwarted belongingness, and acquired capability may provide the most accurate assessment, but many of the variables displayed in Fig. 1 could be used to generate estimates of risk. When military personnel score high in all three of these areas, it may be important to take additional risk precautions to ensure safety.

Assessment may also be important in terms of what duties are assigned to military personnel. One study found that military personnel who had access to firearms as a part of their duties accounted for over 50% of suicides, with many of these incidents taking place while the individuals were on the job rather than off duty (Mahon et al., 2005). If an individual is designated at higher risk for

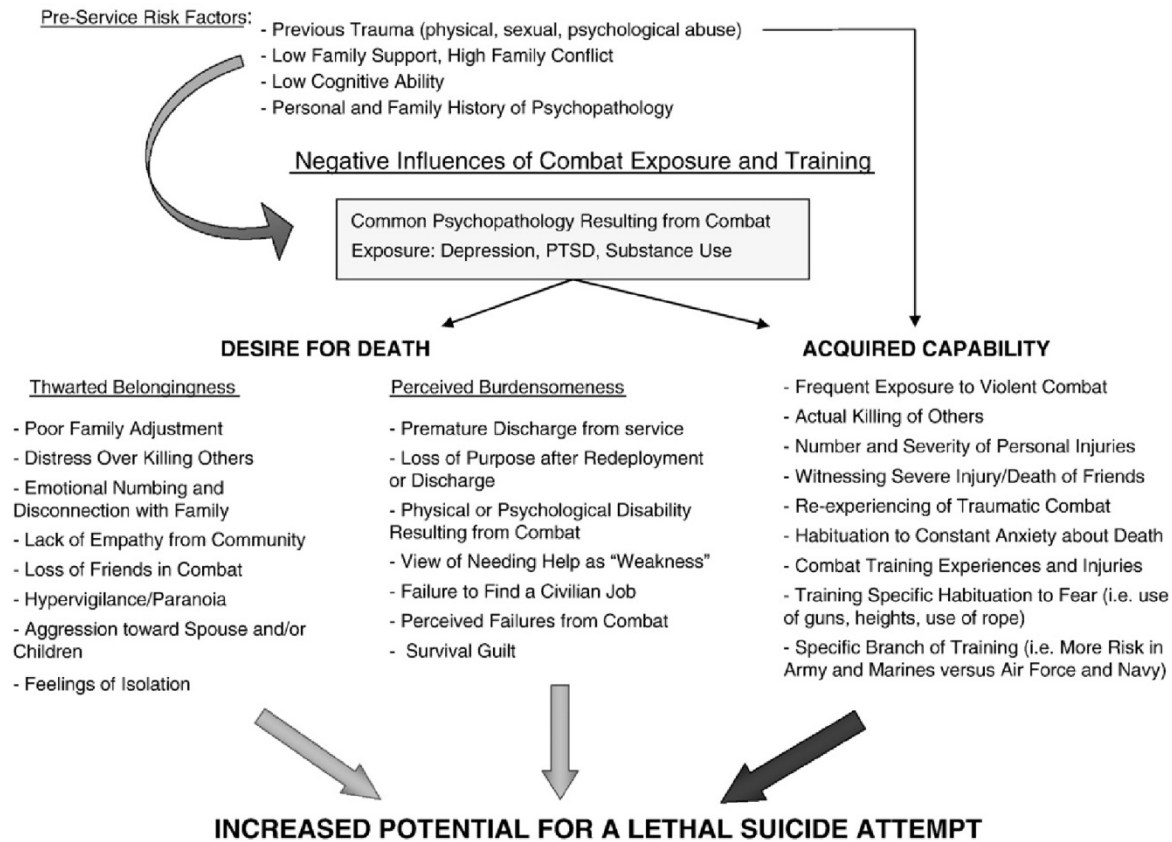


Fig. 1. Negative influences of military service on suicidal behavior as viewed through an IPTS lens.

suicide, it may be beneficial to reassign them to duties that do not have easy access to firearms. In reassigning the soldier, however, it may be important to monitor humiliation reactions that may arise. Similarly, training recruits determined to be at risk for suicide may need to be restricted from firearm training, as one study found that a high percentage of suicides during basic training took place during marksmanship training (Scoville et al., 2004).

5.3. Improving treatment for suicidality in the military

Numerous potentially useful approaches towards addressing thwarted belongingness and perceived burdensomeness exist. Although an ideal solution would involve ensuring improvement of the quality of relationships with non-military peers and family as well, increasing communication with fellow military personnel and veterans, with whom such soldiers could share experiences, might serve as an effective point of crisis intervention capable of mitigating severely thwarted belongingness. Programs such as Battlemind Transition Training, which is currently being researched at the Walter Reed Medical Center, could help veterans reintegrate into civilian life in a manner that helps maintain military relationships without neglecting non-military relationships, while simultaneously addressing a variety of mental health outcomes (Adler, Castro, Bliese, McGurk, & Miliken, 2007; Adler et al., 2006). Meaning-making may also be an important future avenue for therapy, as finding a higher meaning for combat and traumatic experiences could mitigate some of the deleterious effects of combat exposure (Schok et al., 2008). Strategies might include examining the potential positive contributions made and highlighting personal growth from the experiences, hopefully decreasing perceived burdensomeness.

Although acquired capability may not be directly treatable, explaining to combat veterans how their experiences may have contributed to invincibility or fearlessness toward pain and death may

help them maintain awareness of their increased risk. It could be communicated to military personnel in general that they should seek help immediately when they feel suicidal, not because they are weak, but to the contrary, because they may lack fear. This explanation may also help decrease cognitive barriers to seeking aid for mental health.

6. Conclusion

This review has highlighted evidence indicating the IPTS as a valuable framework for understanding, researching, assessing, and treating suicidal behavior in the military. Military experience may increase suicidal behavior, primarily due to the painful and provocative situations resulting from combat, which may increase acquired capability and enhance one's ability to inflict lethal self-injury. Combat exposure may also result in feelings of thwarted belongingness and increased feelings of being a burden on others. When all three of these components are present, an individual's suicide risk is likely to be high. Suicide in the military is a complex phenomenon, but using the IPTS framework may help improve the situation for some of our nation's most valuable resources and the families of those who serve.

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